

**Claims**

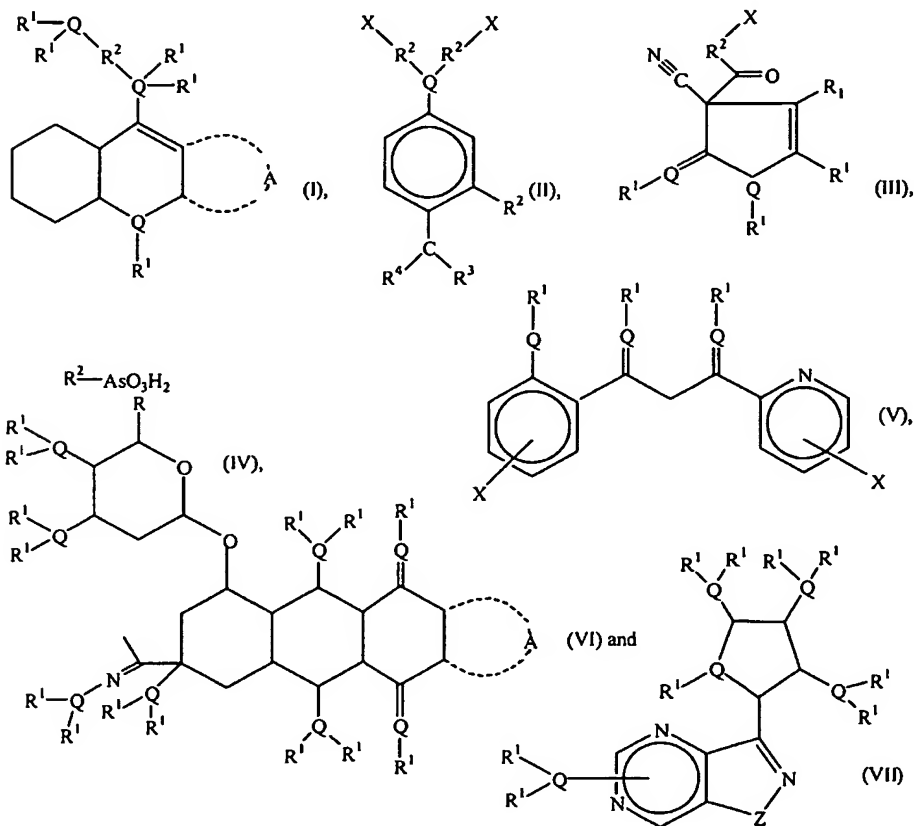
1. A kit for activating gene transfer, said kit comprising a gene transfer activating compound, packaged in a suitable container together with instructions for use to activate gene transfer.

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2. The kit of claim 1 wherein said gene transfer activating compound has a molecular weight of between 300 and 2000.

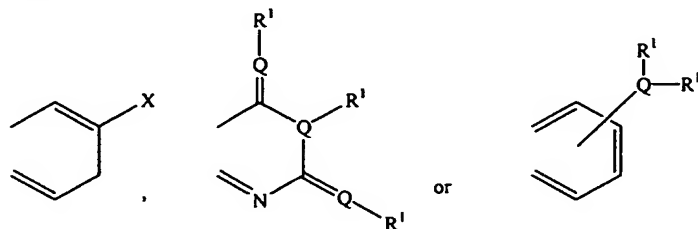
3. The kit of claim 1 wherein said gene transfer compound is selected from the group consisting of:

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wherein Q is nitrogen or oxygen, wherein each occurrence of  $R^1$  independently is H,  $CH_3$ ,  $CH_2CH_3$  or a nullity, wherein  $R^2$  is  $C_1$ - $C_{18}$  alkyl,  $C_2$ - $C_{18}$  ether,  $C_2$ - $C_{18}$  thioether,  $C_2$ - $C_{18}$  secondary or tertiary amine,

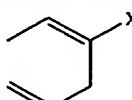
wherein A is



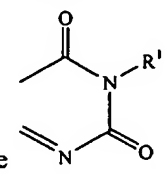
- wherein  $R^3$  is H,  $C_1$ - $C_6$  alkyl, or a heteroatom substituted  $C_1$ - $C_6$  alkyl where the heteroatom is oxygen, nitrogen, or sulfur, wherein  $R^4$  is  $C_2$ - $C_6$  amide, or  $=N-R^5$  where  $R^5$  is  $C_7$ - $C_{12}$  aryloxy,  $C_1$ - $C_6$  hydronyl, carbonyl, carboxyl, or acyl, imidazolyl, pyrazolyl, thiazolyl, or oxazolyl, wherein X is H, F, Cl or Br, wherein Z is oxygen or sulfur.

4. The kit of claim 1 wherein said gene transfer compound is bouvardin.

5. The kit of claim 3 wherein said gene transfer compound is that

of structure I, wherein A is , and Q is nitrogen in each occurrence.

6. The kit of claim 3 wherein said gene transfer compound is that

of structure I, wherein A and each occurrence of Q together are .

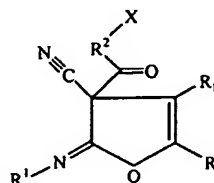
7. The kit of claim 3 wherein said gene transfer compound is that of structure II wherein Q is nitrogen and  $R^2$  is  $C_1$ - $C_{18}$  alkyl.

8. The kit of claim 7 wherein  $R^4$  is  $=N-R^5$ .

9. The kit of claim 7 wherein X is Cl or Br.

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10. The kit of claim 3 wherein said gene transfer compound is that

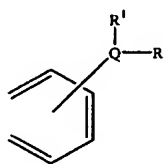


of structure III wherein Q in each occurrence together are

11. The kit of claim 10 wherein said gene transfer compound is that  
10 of structure II or VII wherein each occurrence of  $R^1$  is H, or  $CH_3$ .

12. The kit of claim 3 wherein said gene transfer compound is that  
of structure V wherein Q in each occurrence is oxygen.

13. The kit of claim 3 wherein said gene transfer compound is that  
15 of structure VI wherein Q in each occurrence is oxygen.



14. The kit of claim 13 wherein A is

15. The kit of claim 3 wherein said gene transfer compound is that  
20 of structure VII wherein Q in each non-aromatic substituent occurrence is oxygen.

16. The kit of claim 15 wherein  $R^1$  in each occurrence is H.

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17. The kit of claim 3 wherein said compound is selected from the group consisting of: NSC73609, NSC82090, NSC101492, NSC102821, NSC106191, NSC108613, NSC109325, NSC128720, NSC143491, NSC259968, NSC373989 and NSC675865.

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18. The kit of claim 1 further comprising a recombinant gene transfer vector.

19. The kit of claim 18 wherein said recombinant vector is a virus.

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20. The kit of claim 1 further comprising a recombinant adenovirus.

21. The kit of claim 19 wherein said virus is selected from the group consisting of: lentivirus, adeno-associated virus, retrovirus, vaccinia virus, and herpes simplex virus.

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22. The kit of claim 18 wherein said recombinant vector is a plasmid.

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23. The kit of claim 18 wherein the recombinant gene transfer vector comprises a nucleic acid sequence encoding a protein.

24. The kit of claim 1 further comprising a biologically acceptable carrier.

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25. The kit of claim 18 wherein the recombinant gene transfer vector is an oligonucleotide.

26. The kit of claim 18 wherein the recombinant gene transfer vector is an RNA molecule.

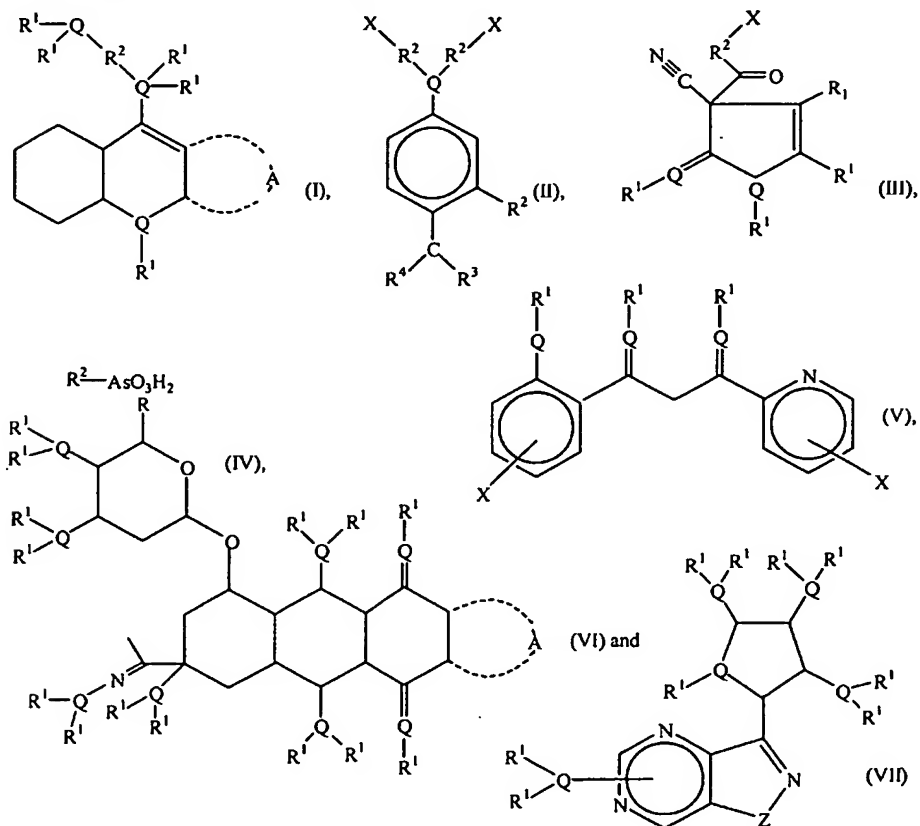
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27. A process for activating gene transfer of a vector to a cell comprising the steps of:

contacting a cell with a recombinant gene transfer vector; and

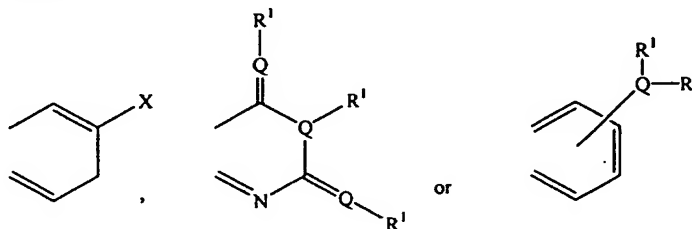
administering a gene transfer activating compound to the cell, such that  
5 transfer of the vector to the cell is activated.

28. The process of claim 27 wherein the gene transfer activating compound is selected from the group consisting of:



wherein Q is nitrogen or oxygen, wherein each occurrence of R<sup>1</sup> independently is H, CH<sub>3</sub>, CH<sub>2</sub>CH<sub>3</sub> or a nullity, wherein R<sup>2</sup> is C<sub>1</sub>-C<sub>18</sub> allyl, C<sub>2</sub>-C<sub>18</sub> ether, C<sub>2</sub>-C<sub>18</sub> thioether, C<sub>2</sub>-C<sub>18</sub> secondary or tertiary amine,

wherein A is



wherein R<sup>3</sup> is H, C<sub>1</sub>-C<sub>6</sub> alkyl, or a heteroatom substituted C<sub>1</sub>-C<sub>6</sub> alkyl where the heteroatom is oxygen, nitrogen, or sulfur, wherein R<sup>4</sup> is C<sub>2</sub>-C<sub>6</sub> amide, or =N-R<sup>5</sup> where R<sup>5</sup> is C<sub>7</sub>-C<sub>12</sub> aryloxy, C<sub>1</sub>-C<sub>6</sub> hydronyl, carbonyl, carboxyl, or acyl, imidazolyl, pyrazolyl, thiazolyl, or oxazolyl, wherein X is H, F, Cl or Br, wherein Z is oxygen or sulfur.

29. The process of claim 27 wherein the gene transfer activating compound is selected from the group consisting of: NSC73609, NSC82090, NSC101492, NSC102821, NSC106191, NSC108613, NSC109325, NSC128720, NSC143491, NSC259968, NSC373989 and NSC675865.

30. The process for activating gene transfer of claim 27 wherein said cell is selected from the group consisting of: neural, muscle, blood, glial, fibroblast, keratinocyte, hepatocyte, epidermal, endothelial, epithelial and tumor.

31. The process for activating gene transfer of claim 27 wherein said recombinant vector is a virus.

32. The process for activating gene transfer of claim 27 wherein said virus is adenovirus.

33. The process for activating gene transfer of claim 27 wherein said gene transfer vector is selected from the group consisting of: lentivirus, adeno-associated virus, retrovirus, vaccinia virus, and herpes simplex virus.

5           34. The process for activating gene transfer of claim 27 wherein said recombinant vector is a plasmid.

          35. The process for activating gene transfer of claim 27 wherein said cell is a human cell.

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36. A process for determining the efficacy of a putative gene transfer activating compound to activate gene transfer, comprising the steps of:

administering a test compound to a first cell;

contacting the first cell with a first amount of a recombinant vector;

15           contacting a second cell with a second amount of the recombinant vector, the second amount of the recombinant vector substantially equal to the first amount;

measuring a gene transfer indicator in the first cell to obtain a test measurement;

20           measuring the gene transfer indicator in the second cell to obtain a control measurement;

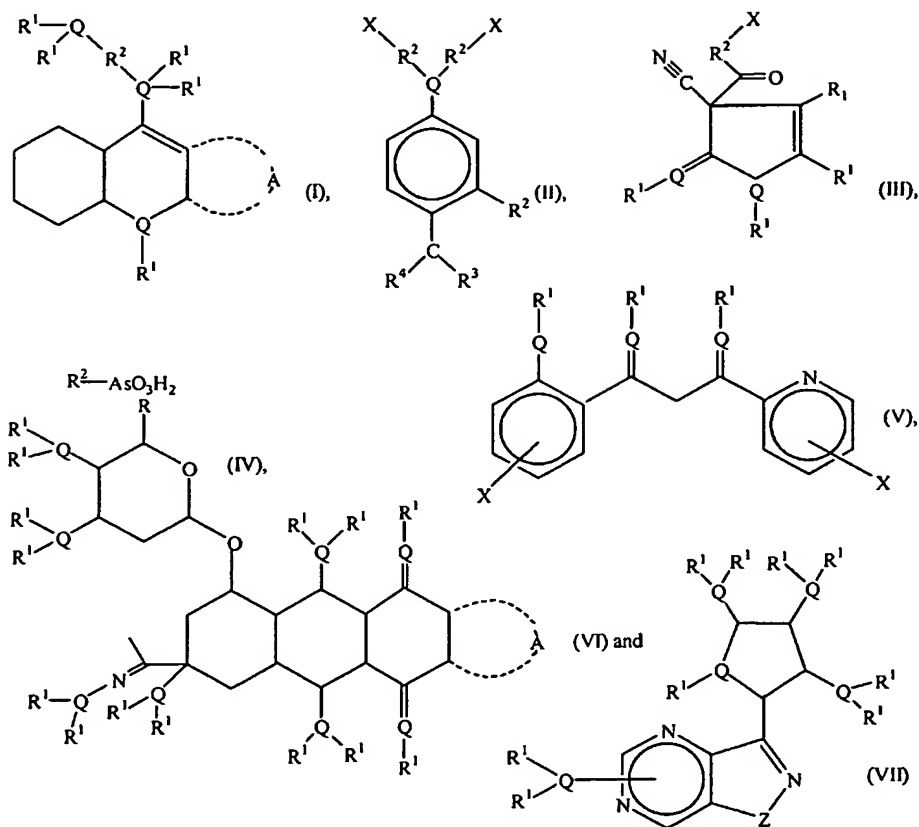
and

          comparing the test measurement and the control measurement to determine the efficacy of the putative gene transfer activating compound to  
25           activate gene transfer.

37. Use of a compound of Formulae I-VII for use as a gene transfer activating compound.

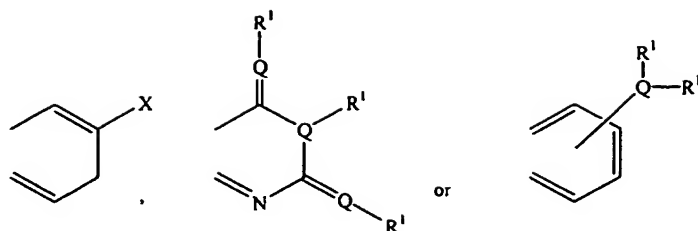
30           38. The use of claim 37 wherein said gene transfer activating compound has a molecular weight of between 300 and 2,000.

39. The use of claim 37 wherein said gene transfer compound is selected from the group consisting of:



wherein Q is nitrogen or oxygen, wherein each occurrence of R<sup>1</sup> independently  
 5 is H, CH<sub>3</sub>, CH<sub>2</sub>CH<sub>3</sub> or a nullity, wherein R<sup>2</sup> is C<sub>1</sub>-C<sub>18</sub> allyl, C<sub>2</sub>-C<sub>18</sub> ether, C<sub>2</sub>-C<sub>18</sub>  
 thioether, C<sub>2</sub>-C<sub>18</sub> secondary or tertiary amine,  
 wherein A is



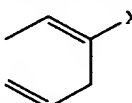


wherein  $R^3$  is H,  $C_1$ - $C_6$  alkyl, or a heteroatom substituted  $C_1$ - $C_6$  alkyl  
 where the heteroatom is oxygen, nitrogen, or sulfur, wherein  $R^4$  is  $C_2$ - $C_6$   
 amide, or  $=N-R^5$  where  $R^5$  is  $C_7$ - $C_{12}$  aryloxy,  $C_1$ - $C_6$  hydronyl, carbonyl,  
 5 carboxyl, or acyl, imidazyl, pyrazyl, thiazyl, or oxazyl, wherein X is H, F, Cl or  
 Br, wherein Z is oxygen or sulfur.

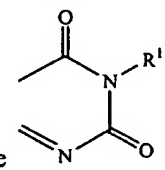
40. The use of claim 37 wherein said gene transfer compound is  
 bouvardin.

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41. The use of claim 39 wherein said gene transfer compound is that

of structure I, wherein A is , and Q is nitrogen in each occurrence.

42. The use of claim 39 wherein said gene transfer compound is that

15 of structure I, wherein A and each occurrence of Q together are .

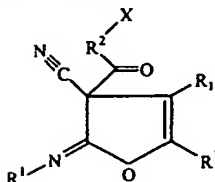
43. The use of claim 39 wherein said gene transfer compound is that  
 of structure II wherein Q is nitrogen and  $R^2$  is  $C_1$ - $C_{18}$  alkyl.

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44. The use of claim 43 wherein  $R^4$  is  $=N-R^5$ .

45. The use of claim 43 wherein X is Cl or Br.

46. The use of claim 39 wherein said gene transfer compound is that



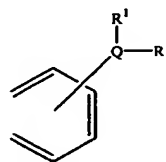
of structure III wherein Q in each occurrence together are

5 47. The use of claim 46 wherein said gene transfer compound is that of structure II or VII wherein each occurrence of R¹ is H, or CH₃.

48. The use of claim 39 wherein said gene transfer compound is that of structure V wherein Q in each occurrence is oxygen.

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49. The use of claim 39 wherein said gene transfer compound is that of structure VI wherein Q in each occurrence is oxygen.



50. The use of claim 49 wherein A is

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51. The use of claim 39 wherein said gene transfer compound is that of structure VII wherein Q in each non-aromatic substituent occurrence is oxygen.

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52. The use of claim 51 wherein R¹ in each occurrence is H.

53. The use of claim 39 wherein said compound is selected from the group consisting of: NSC73609, NSC82090, NSC101492, NSC102821, NSC106191, NSC108613, NSC109325, NSC128720, NSC143491, NSC259968, NSC373989 and NSC675865.

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54. A process of claim 27 substantially as described herein in any of the examples.